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## AS Chemistry

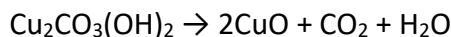
C5.3: Titration and other Calculations

Assignment Questions

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Year 2024

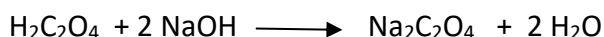
## Titration And Other Calculations

Q1: When malachite is heated to approximately 300°C, water, carbon dioxide and copper(II) oxide are formed. The equation for this decomposition is



Calculate the maximum volume of carbon dioxide that could be produced when 0.810g of malachite is thermally decomposed. Assume that the gas is collected at a temperature of 25°C and 101kPa pressure. Give your answer to an appropriate number of significant figures and state the units. [The ideal gas equation is  $pV = nRT$ . Gas constant ( $R$ ) =  $8.31\text{Jmol}^{-1}\text{K}^{-1}$ ].

Q2: Ethanedioic acid reacts with sodium hydroxide:



In a titration, 27.50 cm<sup>3</sup> of 0.0500 mol dm<sup>-3</sup> ethanedioic acid reacted completely with 25.0 cm<sup>3</sup> of a sodium hydroxide solution. Calculate the concentration of the sodium hydroxide.

Q3: The error when using a 25 cm<sup>3</sup> pipette is 0.06 cm<sup>3</sup>. Calculate the percentage error when using this pipette.

Q4: Copper (II) sulfate can be prepared from Copper (II) oxide and sulfuric acid.



a) Calculate the theoretical yield of copper (II) sulfate from 2.5 g of copper (II) oxide.

b) The actual yield was 3.5 g of copper(II) sulfate. Calculate the percentage yield.

Q5: Hydrogen can be manufactured by the electrolysis of water:



a) Calculate the atom economy for making hydrogen this way.

b) Suggest the way to improve the atom economy of this process.

Q6: Anhydrous sodium carbonate, Na<sub>2</sub>CO<sub>3</sub> was used to make 0.1 mol dm<sup>-3</sup> standard solution.

a) Calculate the amount of sodium carbonate needed to make 250 cm<sup>3</sup> of this solution.

b) Calculate the mass of sodium carbonate needed.